REMARKS

The Office Action dated January 13, 2004 has been received and carefully noted. The following remarks are submitted as a full and complete response thereto. Claims 1-40 are pending in the above-cited application and are submitted for reconsideration. Applicants wish to thank the Examiner for indicating that claims 3-5, 11-15, 18-20, 25, 26, 32 and 36-40 contain allowable subject matter. Reconsideration of the rejections against the other claims is respectfully requested.

Claims 1, 2, 6-10, 16, 17, 21-24 and 27-29 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Giroux et al.* (U.S. Patent Publication 2002/0089933) in view of *Yang et al.* (U.S. Patent No. 6,097,698). Claims 30, 31 and 33-35 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Giroux et al.* in view of *Yang et al.* and Basso et al. (U.S. Patent No. 5,787,071). The above rejections are respectfully traversed according to the remarks that follow.

The present invention is directed, according to claim 1, to a shared memory packet switching device having a plurality of receive ports for receiving data packets, and a plurality of transmit ports for transmitting data packets. The device includes a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports and at least one input logic unit associated with at least one of the receive ports, and being operative to determine whether the associated receive port is saturated by determining whether a number of packets received via the associated receive

port and currently stored in the shared memory exceeds a predetermined drop threshold value. The device further includes a packet routing control unit communicatively coupled with the at least one input logic unit, and being operative to determine a destination one of the transmit ports for each of the received data packets and at least one output logic unit associated with at least one of the transmit ports, the output logic unit being communicatively coupled with the packet routing control unit, and being operative to determine whether the associated transmit port is congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the associated transit port exceeds a predetermined congestion threshold value, and also being operative to generate an associated output full signal indicative of whether the associated transmit port is congested. The input logic unit is responsive at least in part to each of the output full signals, and being further operative to cause a selected packet received via the associated receive port to be dropped if the associated receive port is currently saturated and the output full signals indicate that a destination transmit port associated with the selected packet is currently congested.

The present invention is directed, according to claim 16, to a shared memory packet switching device having a plurality of receive ports for receiving data packets, and a plurality of transmit ports for transmitting data packets. The device includes a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports, at least one input logic unit associated with at least one of the receive ports, and being operative to determine whether the associated receive port is

saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, a packet routing control unit communicatively coupled with the at least one input logic unit, and being operative to determine a destination one of the transmit ports for each of the received data packets, the packet routing unit being further operative to generate a plurality of transmit signals each being associated with one of the transmit ports, and to assert a particular one of the transmit signals when a received packet is to be transmitted via the associated transmit port and at least one output logic unit associated with at least one of the transmit ports, the output logic unit being communicatively coupled with the packet routing control unit, and being operative to determine whether the associated transmit port is congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the associated transit port exceeds a predetermined congestion threshold value, and also being operative to generate an associated output full signal indicative of whether the associated transmit port is congested. The packet routing control unit is also responsive to the output fill signals, and is operative to generate a plurality of filter signals for indicating that a received packet is destined for a congested one of the transmit ports. The input logic unit is further responsive to each of the filter signals, and further operative to cause a selected packet received via the associated receive port to be dropped if the associated receive port is currently saturated and the filter signals indicate that a destination transmit port associated with the selected packet is currently congested.

The present invention is directed, according to claim 27, to a process of controlling the flow of data through a shared memory packet switching device having a plurality of receive ports for receiving data packets, a plurality of transmit ports for transmitting data packets, and a shared memory providing a shared memory space for temporary storage of data packets received via the receive ports. The process includes the steps of receiving a packet via an associated one of the receive ports, determining whether the associated receive port is currently saturated by determining whether a number of packets received via the associated receive port and currently stored in the shared memory exceeds a predetermined drop threshold value, determining a destination one of the transmit ports associated with the received data packet, determining whether the destination transmit port is currently congested by determining whether a number of packets currently stored in the shared memory that are to be transmitted via the destination transmit port exceeds a predetermined congestion threshold value and dropping the received packet if the associated receive port is currently saturated and the destination transmit port is currently congested.

Giroux et al. is directed to a method and system for detecting and controlling congestion in a multi-port shared memory switch. The switch receives data from various sources and temporarily stores the data in a shared memory buffer. The switch also includes a local congestion monitoring means for setting and monitoring queue length thresholds for each output queue. The Office Action acknowledges that *Giroux et al.* fail

to teach determining whether the associated receive port is currently saturated, and thus also cites *Yang et al.*

Yang et al. is directed to a switching node that has a control element that discards cells if the cell occupancy of the buffer exceeds a predetermined threshold level. The Office Action alleges that *Yang et al.* teaches "in effect, the system determines if a certain input has exceeded it fair share of bandwidth," and acts accordingly. Applicants respectfully assert that *Yang et al.* fails to teach or suggest what has been alleged, as discussed below.

Yang et al. discloses that threshold values, TH(VCn), are set for each virtual circuit. These are illustrated in Fig. 4 of *Yang et al.* However, the buffer illustrated is connected to the output of the switch. As discussed in *Yang et al.*, column 6, lines 49-54, "if the switching node 11(n) is receiving cells for the virtual circuits VCn associated with the buffer portion 32(o) more rapidly than it can transmit them over the output communication link 43, the occupancy level of the buffer portion 32(o), that is, the number of cells that are being buffered, will increase." Thus, each portion of the buffer set aside is set aside based on an *output* virtual circuit. It is for that reason that threshold values are established and packets are dropped if the transmission port is congested.

Thus, *Yang et al.* teaches nothing more than what the Office has alleged that *Giroux et al.* teaches, i.e. that received packets are dropped if the transmission port is currently congested. *Yang et al.* fails to teach or suggest that if a certain input exceeds its fair share that data should be dropped. Additionally, since *Yang et al.* merely discloses

what it has been alleged that *Giroux et al.* discloses, the motivation to combine the references would be moot since no benefit would accrue through their combination. Also, the motivation provided for the combination would not suggest the combination since *Yang et al.* fails to teach or suggest taking into account incoming saturation. As such, Applicants respectfully assert that the rejection of claims 1, 16 and 27 is improper for failing to teach or suggest all of the elements of those claims.

Additionally, with respect to the rejections of claims 30, 31 and 33-35, the Office cites *Basso et al.*, for its alleged teaching of generating backpressure signals. However, even if *Basso et al.* were accepted as teaching what has been suggested, which Applicants do not admit, *Basso et al.* would not cure the deficiencies of the *Giroux et al.* and *Yang et al.* discussed above. Thus, Applicants respectfully assert that the rejection of claims 30, 31 and 33-35 is improper and should be withdrawn. Similarly, claims 2-15, 17-26 and 28-40 all depend from independent claims 1, 16 and 27 and should be allowed for at least the same reasons as discussed above for the independent claims. Reconsideration and withdrawal of the all rejections are respectfully requested and it is respectfully requested that the application be allowed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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